**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

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| Applicant: | Meir MORAG, et al. |
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| Examiner: | HOLTON, Steven E. |

Mail Stop Amendment
Honorable Commissioner of Patents
P.O. Box 1450
Alexandria, VA 22313-1450

**RESPONSE TO RESTRICTION REQUIREMENT AND PRELIMINARY AMENDMENT**

Sir:

Please make amendments to the claims as set forth below and consider this a response to the Restriction Requirement dated May 16, 2006.

## IN THE CLAIMS

1. (Currently Amended) Device for user interaction via object location in conjunction with an electronically refreshable display screen, the device comprising:

a transparent ~~sensing~~ arrangement of ~~detectors~~ sensors located at said electronically refreshable display screen for detecting a location of said object, said ~~detectors~~ sensors having outputs, and

an arrangement of amplifiers for producing differential signals associated with said outputs, said differential signals being signals indicative of a differential between at least two of said outputs, said device being operable to use said signals in said interaction.

2. (Original) The device of claim 1, wherein said amplifiers are differential amplifiers.

3. (Currently Amended) The device of claim 1, wherein said arrangement of ~~detectors~~ sensors is configured for detecting an electric field.

4. (Original) The device of claim 1, wherein said electronically refreshable display screen comprises a flat panel type display screen.

5. (Original) The device of claim 1, wherein the object is a pointing device.

6. (Original) The device of claim 5, wherein the pointing device is a stylus.

7. (Original) The device of claim 1, wherein the object is a gaming piece.

8. (Original) The device of claim 1, integrated with a flat panel display.

9. (Original) The device of claim 1, packaged as an accessory to a mobile computer.

10. (Currently Amended) The device of claim 1, wherein the transparent ~~sensing~~ arrangement of sensors comprises at least one organic conductive foil.

11. (Currently Amended) The device of claim 1, wherein the transparent ~~sensing~~ arrangement of sensors comprises at least one ITO foil.

12. (Original) The device of claim 1, further comprising at least one high pass amplifier connected between sensors of said sensing arrangement and said amplifier arrangement.

13. (Currently Amended) The device of claim 1, wherein said transparent ~~sensing~~ arrangement of sensors comprises a grid of straight line ~~sensors~~ conductors.

14. (Currently Amended) The device of claim 1, wherein said arrangement of differential amplifiers comprises a plurality of differential amplifiers each having a first differential input and a second differential input, and wherein said first differential input is connected to an output of a first sensor, and said second differential input is connected to an output of a second sensor ~~beyond a stylus effective field of~~ wherein the distance between said first and second sensor is larger than the effective range of the signal transmitted by said object.

15. (Currently Amended) The device of claim 14, wherein the distance between said second sensor and ~~is at a minimal distance beyond said stylus effective field of~~ said first sensor is slightly larger than the effective range of the signal transmitted by said object.

16. (Canceled)

17. (Original) The device of claim 14, further being configured to detect phases of signals of said sensors, thereby to distinguish between signals from different sensors.

18. (Original) The device of claim 1, wherein said arrangement of differential amplifiers comprises a plurality of differential amplifiers each having a first differential input and a

second differential input, and wherein each of said differential inputs is connected to at least two outputs, each of said at least two outputs being associated with respectively non-neighboring sensors.

19. (Original) The device of claim 18, wherein each object is configured to produce a field able to affect several neighboring sensors and wherein said respectively non-neighboring sensors per amplifier are selected such that different object positions generate outputs at different combinations of amplifiers, thereby permitting different amplifier combinations to be decoded to individual sensors.

20. (Original) The device of claim 18, further being configured to detect phases of said sensor signals, thereby to distinguish between signals from different sensors.

21. (Original) The device of claim 14, wherein each of said differential inputs are connected to at least two outputs, each of said at least two outputs being associated with respectively non-neighboring sensors.

22. (Original) The device of claim 1, wherein said object is a passive object, the digitizer further comprising an excitation arrangement located about said screen for sending an excitation signal to said object, thereby to energize said object to generate an electric field.

23. (Original) The device of claim 22, wherein said excitation arrangement is controllable to generate said excitation signal at a dynamically variable frequency.

24. (Original) The device of claim 22, wherein said excitation arrangement is controllable to generate said excitation signal at a dynamically variable amplitude.

25. (Original) The device of claim 22, wherein said excitation arrangement is controllable to provide a dynamically variable excitation duration.

26. (Original) The device of claim 22, further comprising blanking controllability for blanking of detection during output of said excitation signal.

27. (Original) The device of claim 26, wherein said blanking controllability is operable to continue said blanking for a predetermined delay after output of said excitation signal.

28. (Original) The device of claim 1, further comprising a compensation database in which differences in conductivity between individual sensors are encoded.

29. (Original) The device of claim 1, further comprising a compensation database in which fixed variations in electromagnetic interference over said sensing arrangement are encoded.

30. (Canceled)

31. (Original) The device of claim 1, further comprising an object movement history arrangement for storing data of immediately preceding movement of said object, and using said data in processing of a current location of said object.

32. (Original) The device of claim 31, wherein said processing comprises filtering according to possible hand movements of a user from a prior measured position.

33. (Original) The device of claim 31, wherein said processing comprises filtering according to likely hand movements of a user from a prior measured position.

34. (Original) The device of claim 31, wherein said processing comprises smoothing a locus of said object.

35. (Original) The device of claim 31, further comprising a predictor, associated with said object movement history arrangement for using data of said object movement history arrangement to predict a future locus of said object.

36. (Original) The device of claim 35, wherein said object movement history arrangement with said predictor comprise a slow movement tracker and wherein there is further provided a fast movement tracker for tracking said object, said device being operable to initially set an output of said fast movement tracker as a locus of said object and subsequently to use an output of said slow movement tracker to correct said locus.

37. (Original) The device of claim 1, wherein said object produces an exponentially decaying signal, the digitizer further comprising signal multiplication functionality for multiplying said decaying signal by an opposite, exponentially rising signal, thereby to cancel out frequency side lobes and to increase frequency resolution of said digitizer.

38. (Currently Amended) The device of claim 1, further comprising transform functionality for transforming a detected time domain signal into a frequency domain signal~~, and wherein transform functionality is operable to select a transform type dependent on a likely number of frequencies to be detected~~.

39. (Original) The device of claim 1, further comprising transform functionality for transforming a detected time domain signal into a frequency domain signal, and wherein transform functionality is operable to dynamically select a transform type dependent on a current number of frequencies to be detected.

40. (Original) The device of claim 38, wherein said transform types for selection comprise the Fast Fourier Transform and the Discrete Fourier Transform.

41. (Original) The device of claim 39, wherein said transform types for dynamic selection include the Fast Fourier transform and the Discrete Fourier Transform.

42. (Original) The device of claim 41, comprising a thresholder, associated with said transform functionality, for setting a threshold number of frequencies, said threshold for switching between said Fast Fourier transform for a high number of frequencies relative

to said threshold and said Discrete Fourier transform for a low number of frequencies relative to said threshold.

43.-52. (Canceled)

53. (Original) A digitizer for user interaction with an electronic device having an electronically refreshable display screen, the digitizer comprising:

a transparent sensing grid located on said electronically refreshable display screen for detecting electronic signals from an object, said grid having a plurality of outputs, and

an arrangement of amplifiers wherein each amplifier is connected over at least two outputs of said sensing grid to produce an output signal being a function of said at least two outputs.

54. (Currently Amended) A digitizer for user interaction via an electronically passive object with an electronically refreshable display screen, the digitizer comprising:

a transparent ~~sensing~~ arrangement of ~~detectors~~sensors located at said electronically refreshable display screen for detecting an electric field of said object, said ~~detectors~~sensors having outputs,

an arrangement of amplifiers associated with said outputs, and

an excitation arrangement for generating excitation signals for said passive object to enable said passive object to generate or issue said electric field~~, said excitation arrangement being dynamically controllable to change a sampling rate at which said excitation signal is generated or issued~~.

55. (Original) The digitizer of claim 54, further comprising a state detector to detect a state of said object, thereby to carry out said dynamic control of said sampling rate.

56. (Original) The digitizer of claim 55, wherein said state detector is operable to detect at least one of a group comprising a user-switched state, a contact state of said object with a surface, a contact state of said object with said screen, a right click and eraser action.

57. (Original) The digitizer of claim 54, further comprising a frequency detector to detect a number of object frequencies present, said number being usable in said dynamic control of said sampling rate.

58. (Currently Amended) A digitizer for user interaction via an electronically passive object with an electronically refreshable display screen, the digitizer comprising:

a transparent ~~sensing~~ arrangement of ~~detectors~~sensors located at said electronically refreshable display screen for detecting an electric field of said object, said ~~detectors~~sensors having outputs,

an arrangement of amplifiers associated with said outputs, and

an excitation arrangement for generating and issuing an excitation signal for said passive object to enable said passive object to generate said electric field,

and wherein said arrangement of amplifiers is controllable, in association with said excitation arrangement, with a blanking period such that said arrangement of amplifiers is prevented from detecting during issuance of said excitation signal.

59. (Currently Amended) A digitizer for user interaction via an object with an electronically refreshable display screen, the digitizer comprising:

a transparent ~~sensing~~ arrangement of ~~detectors~~sensors located at said electronically refreshable display screen for detecting an electric field of said object, said ~~detectors~~sensors having outputs, and

an arrangement of amplifiers associated with said outputs, each amplifier being connected to outputs of at least two respectively non-neighboring sensors, said respectively non-neighboring sensors per amplifier being selected such that different object positions generate outputs at different combinations of amplifiers, thereby permitting different amplifier combinations to be decoded to individual sensors.

60. (Currently Amended) A ~~digitizer~~device for user interaction via ~~an electronically passive~~ object location in conjunction with an electronically refreshable display screen, ~~the digitizer~~ comprising:

a passive electromagnetic stylus;

a transparent sensing arrangement overlaid on said screen;~~of detectors located at said electronically refreshable display screen for detecting an electric field of said object,~~ and wherein said ~~detectors having outputs,~~

~~an~~ transparent sensing arrangement is configured for detecting an electric field of the stylus. ~~of amplifiers associated with said outputs, and~~

~~an excitation arrangement for generating an excitation signal for said passive object to enable said passive object to generate said electric field, said excitation arrangement being dynamically controllable to change a property of said excitation signal.~~

61. (Currently Amended) The ~~digitizer~~device of claim 6~~9~~0, wherein said property is one of frequency, amplitude and phase.

62. (Currently Amended) The ~~digitizer~~device of claim 6~~9~~0, wherein said arrangement is operable to use a state of said object to set said dynamically controllable property.

63. (Currently Amended) The ~~digitizer~~device of claim 62, wherein said state comprises at least one of a user-switched state, a contact state of said object with a surface, a contact state of said object with said screen, a current velocity of said object, a current acceleration state of said object, and a current orientation of said object.

64.-65. (Canceled)

66. (New) The device of claim 14, further being configured to determine which of said two inputs of said differential amplifier is the source of said signal, based on detected signals at several neighboring differential amplifiers.

67. (New) The device of claim 1, further comprising a compensation database in which differences in the magnitude of the signal between individual sensors are encoded.

68. (New) A device according to claim 60, further comprising an excitation arrangement for generating and issuing an excitation signal for said passive electromagnetic stylus to enable said passive electromagnetic stylus to generate said electric field.

69. (New) A device according to claim 68, wherein said excitation arrangement is dynamically controllable to change a property of said excitation signal.

70. (New) A device according to claim 60, whercin the transparent sensing arrangement is comprised of at least one organic conductive foil.

71. (New) A device according to claim 60, wherein the transparent sensing arrangement comprises a grid of straight line conductors.

## REMARKS

Claims 1, 3, 10-11, 13-15, 38, 54, and 58-63 have been amended. Claims 16, 30, 43-52 and 64-65 are canceled. New claims 66-71 have been added. The application now contains 57 total pending claims.

Applicants provisionally elect, without traverse, the invention of Group I, as set forth in Claims 1-15, 17-29, 31-42, 53-63 and 66-71, as amended, to be prosecuted at this time. Applicant reserves the right to file a divisional application for the invention of Group II during the pendency of the present application.

Claims 1, 3, 54, 58 and 59 have been amended to change the wording of "detectors" to "sensors". Although the two words are synonyms, "sensors" has been adopted to provide additional clarity to the claims in view of the specification. Support in the specification for this change can be found on page 16, lines 15-17, *inter alia*.

Claim 13 has been amended to change "grid of straight line sensors" to "grid of straight line conductors", which Applicants believe adds clarity to the claim. Support in the specification for this change can be found on page 16, line 18.

Claim 14 has been amended to remove the term "stylus effective field". In its place is a textual description of this term, the support for which can be found on page 23, line 32 to page 24, line 2.

Claim 15 has been amended to change "minimal distance" to a "slightly larger" distance. Support in the specification for this change can be found on page 23, line 32 to page 24, line 2.

Claim 60 has been amended to clarify that the electronically passive object can be a stylus and that the transparent sensing arrangement is configured for detecting an electric field of the stylus. Support for this amendment can be found on page 17, lines 6-17, *inter alia*. It should be noted that other, non-stylus, passive objects which give off a detectable field could be used as equivalents, for example game tokens.

New claim 66 finds support on page 24, lines 23-32, *inter alia*.

New claim 67 finds support on page 20, lines 4-20.

New claim 68 finds support on page 17, lines 1-5 and page 36, line 15 to page 37, line 6 *inter alia*, and was a part of original claim 60.

New claim 69 finds support on page 36, line 15 to page 37, line 6 *inter alia*, and was a part of original claim 60.

New claim 70 finds support on page 18, line 8.

New claim 71 finds support on page 16, line 18.

It should be understood that none of the amendments made herein are for the avoidance of cited prior art and are intended to provide additional clarity to the claims and to expedite prosecution. In light of the above remarks and amendments, an action on the merits is respectfully awaited.

Respectfully submitted,
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